UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/524,805	04/05/2005	Alfred Ramirez	HSE-060USRCE	1023

959 7590 05/01/2008
LAHIVE & COCKFIELD, LLP
ONE POST OFFICE SQUARE
BOSTON, MA 02109-2127

EXAMINER	
MAYES, MELVIN C	
ART UNIT	**PAPER NUMBER**
1791	
MAIL DATE	**DELIVERY MODE**
05/01/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/524,805	RAMIREZ ET AL.	
	Examiner	**Art Unit**	
	Melvin C. Mayes	1791	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 February 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20,22,23 and 25-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20,22,23 and 25-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

(1)

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 5, 2008 has been entered.

Claim Rejections - 35 USC § 112

(2)

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

(3)

Claims 25 and 26 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 25 and 26 claim "formed by the method of claim 23" however claims 23 is directed to an interconnector plate, not to a method.

Claim Rejections - 35 USC § 102 and 103

(4)

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

(5)

Claims 1, 2, 4, 6, 13-17, 27 and 29 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Minh et al. 5,290,642.

Minh et al. 5,290,642 discloses a method of making a solid oxide fuel cell core (electrochemical converter) which includes an interconnect (interconnector component or plate) comprising:

casting a tape from a slurry of lanthanum chromite powder for the interconnect (first or second tape or sheet);

casting a tape from a slurry of zirconia powder for an electrolyte (first or second tape);

laminating the tapes with cathode and anode tapes;

cutting the tapes into laminates;

sintering to partially densify;

laminating the sintered and densified components to form a stacked assembly; and

heat treating to sinter and fully densify the assembly using a compressive force (pressure) during sintering and densifying (thus hot pressing) to promote contact and interbonding, the heat treating to sinter and densify being at temperature of 1000-1400°C. (col. 6-8).

Further, by heat treating using a compressive force to fully densify a stacked assembly including a partially densified tape of lanthanum chromite for forming an interconnect, a step

of hot pressing using heat and pressure to form an interconnector component that contains chromium, as claimed in Claims 1 and 13, is obviously performed.

Regarding Claim 2, one tape is formed from a slurry of lanthanum chromite powder (thus a powder comprising chromium).

Regarding Claim 4, one tape is formed from a slurry of lanthanum chromite powder.

Regarding Claim 6, after laminates tapes, the tapes are cut into laminates.

Regarding Claim 14, the assembly is heat treated using compressive force to fully densify the assembly (thus a sintered structure of specific density of at least 96%).

Regarding Claim 15, the lanthanum chromite is in powder form.

Regarding Claim 16, the tape is laminated to another tape prior to applying heat and pressure.

Regarding Claim 17, the tape is sintered to partially densify before applying heat and pressure.

Regarding Claim 27, the interconnect layer is thin (0.002-0.005 cm) (0.0008-0.002 inches) (thus interconnector component with thickness less than about 0.03 inches).

Regarding Claim 29, the heat treating under pressure is at 1000-1400°C (thus in arrange of about 1300°C).

(6)

Claims 1, 2, 4, 5, 13-17, 27 and 29 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Minh et al. 5,256,499.

Minh et al. 5,256,499 discloses a method of making a solid oxide fuel cell core (electrochemical converter) which includes an interconnect (interconnector component or

plate) comprising:

casting a tape from a slurry of lanthanum chromite powder for the interconnect (first or second tape or sheet);

casting a tape from a slurry of zirconia powder for an electrolyte (first or second tape);

cutting and pressing the tapes into the desired shaped elements;

laminating the elements;

sintering to partially densify;

laminating the sintered and densified components to form a stacked assembly; and

heat treating to sinter and fully densify the assembly using a compressive force (pressure) during sintering and densifying (thus hot pressing) to promote contact and interbonding, the heat treating to sinter and densify being at temperature of 1000-1400°C. (col. 5-8)

Further, by heat treating using a compressive force to fully densify a stacked assembly including a partially densified tape of lanthanum chromite for forming an interconnect, a step of hot pressing using heat and pressure to form an interconnector component that contains chromium, as claimed in Claims 1 and 13, is obviously performed.

Regarding Claim 2, one tape is formed from a slurry of lanthanum chromite powder (thus a powder comprising chromium).

Regarding Claim 4, one tape is formed from a slurry of lanthanum chromite powder.

Regarding Claim 5, the tapes are cut before laminating.

Regarding Claim 14, the assembly is heat treated using compressive force to fully densify the assembly (thus a sintered structure of specific density of at least 96%).

Regarding Claim 15, the lanthanum chromite is in powder form.

Regarding Claim 16, the tape is laminated to another tape prior to applying heat and pressure.

Regarding Claim 17, the tape is sintered to partially densify before applying heat and pressure.

Regarding Claim 27, the interconnect layer is thin (0.002-0.005 cm) (0.0008-0.002 inches) (thus interconnector component with thickness less than about 0.03 inches).

Regarding Claim 29, the heat treating under pressure is at 1000-1400°C (thus in arrange of about 1300°C).

(7)

Claims 2, 3, 18, 23, 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over either Minh et al. 5,290,642 or Minh et al. 5,256,499as applied to claims 1 and 13, and further in view of Simpkins et al. 2002/0081475.

Simpkins et al. 2002/0081475 teaches that in a solid oxide fuel cell, the interconnects can comprise materials such chromium and lanthanum chromite as well as alloys and combinations of the materials [0034].

It would have been obvious to one of ordinary skill in the art to have modified the method of Minh et al. by forming the tape for the interconnect from a combination of lanthanum chromite powder and chromium powder or chromium alloy, as taught by Simpkins et al, as an alternative to lanthanum chromite for an interconnect for a fuel cell. The use of chromium or chromium alloy and lanthanum chromite in combination for making the interconnect would have been obvious to one of ordinary skill in the art as an alternative to just lanthanum chromite, as taught by Simpkins et al., and thus the slurry for the interconnector

comprises a powder or material comprising at least 95% chromium and material forming the interconnector has a composition that is at least 95% chromium, as claimed.

Regarding Claims 25 and 26, Minh et al. disclose that the tape for the interconnector is flat while other tapes are corrugated.

(8)

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over either Minh et al. 5,290,642 or Minh et al. 5,290,642 as applied to claim 1, and further in view of Olsen et al. 2004/0017028.

Olsen et al. teach that in making a solid oxide fuel cell by assembling and sintering layers, narrow tolerance with maximum tolerance of 1% can be achieved by shaping the fuel cell after sintering using various cutting tools [0005]-[0010].

It would have been obvious to one of ordinary skill in the art to have modified the method of Minh et al. by also shaping the solid oxide fuel cell core after heat treating to sinter and fully densify, as taught by Olsen et al., to achieve a solid oxide fuel cell of narrow tolerance with maximum tolerance of 1%.

Olsen et al. has a filing date of 5/12/2003. Provisional application No 60/403,218 filed 8/13/2002 from which the present application has priority does not support a claim directed to trimming the sintered structure.

(9)

Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over either Minh et al. 5,290,642 or Minh et al. 5,290,642 as applied to claim 1, and further in view of Enloe et al. 5,028,650.

Enloe et al. teach that hot pressing to sinter ceramic sheet is performed at pressure of 1000 psi (col. 6, lines 2-5).

It would have been obvious to one of ordinary skill in the art to have modified the method of Minh et al. by heat treating to fully densify under a pressure of 1000 psi, as taught by Enloe et al., as pressure used in hot pressing to sinter ceramic sheet. The use of pressure in the range of 1000 psi would have been obvious to one of ordinary skill in the art to promote contact and interbonding and full densification, as disclosed by Minh et al.

(10)

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over either Minh et al. 5,290,642 or Minh et al. 5,290,642 as applied to claim 13, and further in view of Kotchick et al. 4,913,982.

Kotchick et al. 4,913,982 teach that in making a solid oxide fuel cell core by laminating and sintering tapes, the interconnect and electrolyte material undergo densification to 94-99% of theoretical density, thereby forming a gas tight barrier (col. 10, lines 4-7).

It would have been obvious to one of ordinary skill in the art to have sintered and fully densified the lanthanum chromite interconnect of the assembly of Minh et al. to a density of 94-99% of theoretical density, encompassing at least 96%, as taught by Kotchick et al., to form a gas tight barrier.

(11)

Claims 1, 2, 4, 8, 13, 15, 16 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over McPheeters et al. 5,882,809 in view of Minh et al. 5,290,642.

McPheeters et al. teach that in se a method of making a solid oxide fuel cell (electrochemical converter) which includes an interconnect (interconnector component or plate) comprising:

providing a C/I/A (cathode layer/interconnect layer/anode layer) composite sheet by tape casting;

forming a single cell unit comprising the C/I/A composite sheet;

sintering at high temperature to fuse the component materials together into a finished subassembly; and

painting or spraying a conductive material on either or both end surfaces of the single cell unit (coating the sintered structure with a compound) (col. 4-7). McPheeters does not disclose applying pressure during sintering (hot pressing).

Minh et al. teach that in making a solid oxide fuel cell by laminating and sintering tapes, tape for interconnector is made from lanthanum chromite powder and compressive force is applied during sintering to promote contact and interbonding at the adjacent surfaces (col. 8, lines 41-42).

It would have been obvious to one of ordinary skill in the art to have modified the method of McPheeters et al. by sintering the laminated tape-cast sheets by applying pressure during sintering, as taught by Minh et al., to promote contact and interbonding at the adjacent surfaces.

It would have been obvious to one of ordinary skill in the art to have further modified the

method of McPheeters et al. by providing the tape for the interconnect layer of lanthanum chromite, as taught by Minh et al., as material used for the interconnector of a solid oxide fuel cell. By providing the interconnect layer tape of lanthanum chromite, the interconnector contains chromium, as claimed.

Regarding Claims 8 and 19, McPheeters et al. disclose painting or spraying a conductive material on either or both end surfaces of the single cell unit (thus coating the interconnector component with a compound).

(12)

Claims 1 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over McPheeters et al. 5,882,809 in view of Minh et al. 5,290,642 and Kwon et al. 2005/0019636.

McPheeters et al. disclose a method of making a solid oxide fuel cell (electrochemical converter) which includes an interconnect (interconnector component or plate) comprising:

providing a C/I/A (cathode layer/interconnect layer/anode layer) composite sheet by tape casting;

forming a single cell unit comprising the C/I/A composite sheet;

sintering at high temperature to fuse the component materials together into a finished subassembly; and

painting or spraying a conductive material on either or both end surfaces of the single cell unit (coating the sintered structure with a compound) (col. 4-7). McPheeters does not disclose applying pressure during sintering (hot pressing).

Minh et al. teach that in making a solid oxide fuel cell by laminating and sintering tapes, tape for interconnector is made from lanthanum chromite powder.

Kwon et al. teach that in making a solid oxide fuel cell by sintering tape-cast layers, pressure-sintering such as hot pressing is preferred over pressureless sintering [0035].

It would have been obvious to one of ordinary skill in the art to have modified the method of McPheeters et al. by sintering the laminated tape-cast sheets by applying pressure during sintering (hot pressing), as taught by Known et al, as preferred over pressureless sintering.

It would have been obvious to one of ordinary skill in the art to have further modified the method of McPheeters et al. by providing the tape for the interconnect layer of lanthanum chromite, as taught by Minh et al., as material used for the interconnector of a solid oxide fuel cell. By providing the interconnect layer tape of lanthanum chromite, the interconnector contains chromium, as claimed.

Claims 1 and 8 only have priority to PCT/US03/25517 filed 8/13/2003. Applicant's Provisional application 60/403,218 filed 8/13/2002 does not support the rejected claims.

(13)

Claims 9, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minh et al. 5,290,642 in view of JP 9-190829.

Minh et al. 5,290,642 discloses a method of making a solid oxide fuel cell core (electrochemical converter) which includes an interconnect (interconnector component or plate) comprising:

casting a tape from a slurry of lanthanum chromite powder for the interconnect (first or second tape or sheet);

casting a tape from a slurry of zirconia powder for an electrolyte (first or second tape);

laminating the tapes with cathode and anode tapes;

cutting the tapes into laminates;

sintering to partially densify;

laminating the sintered and densified components to form a stacked assembly; and

heat treating to sinter and fully densify the assembly using a compressive force (pressure) during sintering and densifying (thus hot pressing) to promote contact and interbonding, the heat treating to sinter and densify being at temperature of 1000-1400°C. (col. 6-8).

Minh et al. do not disclose providing the interconnect as a combination of lanthanum chromite layer and chromium layer.

JP 9-190829 teaches that a lanthanum chromite separator of a fuel cell is provided with a metal material layer such as chromium such as by sticking a metallic foil to provide the lanthanum chromite with stability in reducing atmosphere.

It would have been obvious to one of ordinary skill in the art to have modified the method of Minh et al. for making a fuel cell core by laminating a chromium foil to the lanthanum chromite tape, as taught by JP 9-190829, to provide the lanthanum chromite interconnect with stability in reducing atmosphere. By laminating a metallic chromium foil to the lanthanum chromite tape and heating treating the assembly to form the fuel cell, an interconnect comprising a first layer of at least 95% chromium and a second layer of lanthanum chromite formed by laminating and hot pressing is obviously formed.

Regarding Claims 11 and 12, Minh et al. disclose that the tape for the interconnect is planar (flat) while other tapes are corrugated.

(14)

Claims 1, 2, 4, 9-11, 13, 15, 16, 22, 23, 25 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cable 2003/0077498 in view of Minh et al. 5,290,642.

Cable discloses a method of making a multi-layer interconnect comprising:

providing ceramic sheets of ceramic such as lanthanum chromite (first and second tapes);

providing a bonding layer on the outer surface and comprising materials used for the fuel-side vias such as chromium (first layer comprising chromium); and

co-firing [0038, [0042], [0050], [0057-[0058], [0066]. Cable does not disclose applying pressure during co-firing (hot pressing).

Minh et al. teach that in making a solid oxide fuel cell by laminating and sintering tapes, compressive force is applied to promote contact and interbonding at the adjacent surfaces (col. 8, lines 41-42).

It would have been obvious to one of ordinary skill in the art to have modified the method of Cable for making a multi-layer interconnect by co-firing (sintering) the laminated tape-cast sheets by applying pressure during sintering, as taught by Minh et al., to promote contact and interbonding at the adjacent surfaces of the sheets.

Regarding Claim 2, tapes are formed from lanthanum chromite powder (thus a powder comprising chromium).

Regarding Claim 4, tapes are formed from lanthanum chromite.

Regarding Claims 9 and 23, by providing a bonding layer of chromium, a first layer having a composition that is at least 95% chromium is obviously provided or material forming the interconnector has a composition that is at least 95% chromium..

Regarding Claims 10, 22 and 27, the ceramic sheets are made by tape casting and the interconnect is tape cast to a thickness between 0.3 and 0.7 mm (0.01-0.03 inches) or altered according to the relative electrical and physical properties of the desired interconnect/fuel cell stack (thus interconnector component of thickness of about 0.01- 0.03 inches or less than 0.03 inches).

(15)

Claims 13-16, 19, 20, 22 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maricle et al. 4,857,420 in view of Minh et al. 5,290,642.

Maricle et al. disclose a method of making a separator (interconnector) plate for a fuel cell stack comprising:

providing a web portion made from green Mg doped lanthanum chromite sheet cut to size and laying seal flanges for from strip of the same green sheet material on the edges of the cut sheet to obtain the desired thickness;

sintering the green composite member to a density if 94%-96% of theoretical density; and

forming a plate of nickel oxide zirconia anode electrode material on the separator plate by plasma spraying after sintering. (col. 3, lines 34-59, col. 5, line 22). Maricle et al. do not disclose applying pressure during sintering of the interconnector plate (hot pressing).

Minh et al. teach that in making a solid oxide fuel cell by laminating and sintering tapes, compressive force is applied to promote contact and interbonding at the adjacent surfaces (col. 8, lines 41-42).

It would have been obvious to one of ordinary skill in the art to have modified the method of Maricle et al. for making an interconnector plate for a fuel cell stack by sintering the

laminated sheets by applying pressure during sintering, as taught by Minh et al., to promote contact and interbonding at the adjacent surfaces of the composite member of laminated green sheets. Forming the green sheet by casting Mg doped lanthanum chromite powder would have been obvious to one of ordinary skill in the art of ceramic processing as a well known method of making green sheet material.

Regarding Claims 22 and 27, the separator plate has a thickness of 2-10 mils (0.002-0.01 inches) (overlapping the range of about 0.01-0.03 inches as claimed in Claim 22 and encompassed by less than 0.03 inches as claimed in Claim 27)

Response to Arguments

(16)

Applicant's arguments filed February 5, 2008 have been fully considered but they are not persuasive.

Applicant argues that neither Minh et al. '642 nor Minh et al. '499 disclose that the compression force is used to achieve a high density by pressing out the flow passage voids in a monolithic structure, disclose forming a interconnector component which contains chromium or disclose hot pressing used in combination with tape casting.

With respect to the argument that the references do not disclose that compression force is used to achieve a high density by pressing out the flow passage voids in a monolithic structure, Applicant is arguing a limitation which is not claimed. The references do, however, disclose that the heating under compressive force is to sinter the assembly to full densification.

The references disclose that the tape for the interconnect is formed from a slurry of lanthanum chromite powder. Since lanthanum chromite contains chromium, the interconnector thus also contains chromium.

With respect to tape casting, the references disclose that the tapes can be formed by roll mill, extruding, pressing or "tape casting" (Minh '642, col. 6, lines 44-49), thus tape casting in combination with heating under pressure, claimed as "hot pressing."

Applicant argues that neither Simpkins, Olsen nor Kotchick teach hot pressing using a combination of heat and pressure to form the sintered structure.

It is Minh et al. '642 upon which the rejections are based that discloses applying a compressive force during heat treating for sintering in order to promote contact and interbonding at adjacent surfaces (col. 8, lines 39-43). Minh et al. thus disclose using a combination of heat and pressure to form an interconnector component or plate.

Applicant argues that McPheeters, Minh et al. '642 and Kwon do not teach hot pressing using heat and pressure.

Minh et al. '642 teaches applying a compressive force during heat treating for sintering in order to promote contact and interbonding at adjacent surfaces (col. 8, lines 39-43). Thus it would have been obvious to one of ordinary skill in the art to have applied compressive force (pressure) during sintering of the single cell unit of McPheeters which includes an interconnector component. Kwon et al. also teach that in making a solid oxide fuel cell by sintering tape-cast layers, pressure-sintering such as hot pressing is preferred over pressureless sintering. Kwon et al. qualifies as prior art for the rejected claims because Kwon et al. has priority to Provisional

application filed 6/9/2003 while the rejected claims only have priority to PCT/US03/25517 filed 8/13/2003. Applicant's Provisional application 60/403,218 filed 8/13/2002 does not support the rejected claims.

Applicant argues that Minh et al. '642 and JP 9-190829 does not teach an interconnector including a layer of composition that is at least 95% chromium.

JP 9-190829 teaches that it is known to provide a lanthanum chromite separator of a fuel cell with a metal material layer such as chromium such as by sticking a metallic foil to provide the lanthanum chromite with stability in reducing atmosphere. The Examiner maintains the position that it would have been obvious to one of ordinary skill in the art to have modified the method of Minh et al. for making a fuel cell core by laminating a chromium foil to the lanthanum chromite tape, as taught by JP 9-190829, to provide the lanthanum chromite interconnect with stability in reducing atmosphere, thus obviously forming an interconnect comprising a first layer of at least 95% chromium and a second layer of lanthanum chromite, as claimed.

Applicant argues that Minh '642 does not compensate for the deficiencies of Cable or Maricle.

Minh et al. '642 discloses applying a compressive force during heat treating for sintering in order to promote contact and interbonding at adjacent surfaces (col. 8, lines 39-43). Minh et al. thus disclose using a combination of heat and pressure to form an interconnector component or plate, thus it would have been obvious to one of ordinary skill in the art to apply pressure during the sintering in the methods of Cable and Maricle.

Applicant argues that the present invention solves the problem of forming chromium sheets from tape cast green sheets and uses hot press sintering following the tape cast process to produce thinner chromium sheet. However, the claims are not directed to forming chromium sheets but a component that contains chromium or include a material that comprises chromium. Further, the use of "hot press" sintering for tape cast ceramic sheets is known in the art as cited in the rejections. References cited of interest also all teach that cast ceramic tape or tapes can be sintered while applying pressure to the tape or tapes, thus "hot pressing" or "applying heat and pressure to sinter" as claimed. Thus the combination of tape casting and hot pressing or applying heat and pressure to sinter is neither novel nor unobvious.

Conclusion

(17)

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The references disclose using hot pressing or pressure sintering to sinter ceramic tape.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Melvin C. Mayes whose telephone number is 571-272-1234. The examiner can normally be reached on Mon-Fri 7:30 AM - 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Phillip C. Tucker can be reached on 571-272-1095. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Melvin C. Mayes
Primary Examiner
Art Unit 1791

MCM
April 27, 2008

/Melvin C. Mayes/
Primary Examiner, Art Unit 1791